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10/578,546	03/07/2007	Clive Marcus Tunna	M04B100	9468

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EXAMINER	
KASTURE, DNYANESH G	
ART UNIT	PAPER NUMBER
3746	

NOTIFICATION DATE	DELIVERY MODE
06/29/2010	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/578,546	TUNNA ET AL.	
	Examiner	Art Unit	
	DNYANESH KASTURE	3746	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *02 June 2010*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-38* is/are pending in the application.

4a) Of the above claim(s) *5-8,19-21,30-32 and 34-37* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4,9-18,22-29,33 and 38* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *05 March 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *05 May 06*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. Applicant's election without traverse of Group 1, Species B in the reply filed on 02 June 2010 is acknowledged. Claims 5 – 8, 19 – 21, 30 – 32 and 34 – 37 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. With regards to Claim 2, in an interview on 8 June, 2010 applicant's representative – Mr. Ting – Mao Chao stated that although the embodiment of Figure 8 does not directly sense axial load, the other sensed parameters (such as exhaust temperature and power consumption - Page 14, Line 30) are related to the axial load, therefore effecting axial movement is in response to the axial load as claimed. This argument is persuasive because the claim language does not state that effecting axial movement is in DIRECT response to an axial load generated, therefore the claim language is broad enough to incorporate effecting axial movement as an indirect response to an axial load generated. Claims 1-4, 9-18, 22-29, 33, and 38 will therefore be examined on the merits.

Claim Objections

2. Claims 12 and 18 are objected to for the following informalities:

3. In Re Claim 12, the phrase "move the actuator relative to the stator with rotation of the drive shaft" is not in proper idiomatic English. The phrase -- move the actuator relative to the stator BY rotation of the drive shaft – is suggested instead.

4. In Re Claim 18, note that the second bearing assembly implies the existence of a first bearing assembly, and it appears that the bearing assembly in Claim 14 is implicitly being referred to as the first bearing assembly. However, this would be inconsistent with the specification. Page 12 of the specification refers to element (84) of Figure 8 as the first bearing assembly, and element (86) as the second bearing assembly. Clearly, it is the second bearing assembly that is movable by the actuator. The mention of a second bearing assembly in Claim 18 is a contradiction to Claim 14 which suggests that the first bearing assembly is movable by the actuator. It is suggested that the word "second" be changed to – another -- in order to overcome this objection.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claim 29 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

7. In Re Claim 29, it is not clear how the outer diameter "tapers decreasingly". It is assumed that the applicant intended to claim the taper of the rotor, where the diameter of the rotor decreases from the inlet to the outlet.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

9. Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over McCormick et al (US Patent 3,605,188 A) in view of Shaw (US Patent 6,003,324 A)

10. In Re Claim 1, the limitation "means for effecting axial movement of the rotors" meets the three-prong test per MPEP 2181 and thereby invokes 35 USC 112 6th paragraph. In the instant specification, page 13, Lines 8-12, the said means for effecting axial movement in Figure 8 is disclosed as a motor movable bearing assembly (86, 88) having a threaded aperture (104) which engages a shaft (102) coupled to motor (100).

11. McCormick et al discloses a dry pump (Figure 4 embodiment) comprising a stator (30, 31, 32) that houses first (25, 27) and second (26, 28) intermeshing screw rotors adapted for (are capable of) counter-rotation within the stator as depicted, and an apparatus for effecting axial movement of the rotors within the stator to vary at least one clearance between the rotor and stator as suggested in Column 2, Lines 54-56: "It can be seen that axial adjustment of said screws 25 and 26 will vary the clearance between

the screw flights 27 and 28 and the respective conical bores 30 and 31 of the cylinder 32", during the use of the pump as suggested in Column 3, Lines 5-9: "Moreover, such adjustment may be accomplished automatically in response to head pressure by providing a pressure sensor (not shown) at the die inlet which then provides a signal to move the screws forward or rearward as necessary to increase or decrease the head pressure sensed by the sensor".

12. However, the apparatus of McCormick et al is not an equivalent to applicant's means for effecting axial movement in accordance with invoked 112 6th paragraph.

13. Nevertheless, Shaw discloses a first screw rotor (14) and a second screw rotor (16) that are housed at one end in first bearing housing (300) and second bearing housing (306) respectively, the bearings housings are attached to their respective actuators (366, 384) by pins (376, 394). Note that the bearing housings are free to move within respective openings (304, 309) of the stator (220) as suggested in Column 5, Line 63 – Column 6, Line 3: "sufficient for allowing shifting (in Fig. 3 vertical displacement) of bearing". The actuators (366, 384) have threaded follower sleeves (368, 386) respectively. The threaded follower sleeves are coupled to respective drive shafts (372, 390 which are equivalent to applicant's lead screw) of stepper motors (360, 380) respectively. This apparatus for effecting axial movement is equivalent of applicant's means for effecting axial movement because it performs the same function in substantially the same way and produces substantially the same result (MPEP 2183). Note also the following disclosure by applicant with regards to equivalence: "The means for effecting axial movement of the rotors is preferably arranged so as to ensure both

rotors are maintained in the same axial position, BUT MAY ALSO BE CONFIGURED SO AS TO PERMIT RELATIVE AXIAL MOVEMENT between the rotors .. .. The relative movement between the rotors can be achieved using INDEPENDENT MEANS FOR EFFECTING AXIAL MOVEMENT OF EACH ROTOR" (Page 7, Lines 1-9). Applicant has therefore allowed for independent means to effect axial movement of each rotor as an equivalent structure.

14. It would have been obvious to a person having ordinary skill in the art at the time of the invention to incorporate the bearing structure of the screw rotors, actuator and motor as taught by Shaw into the screw rotors of McCormick et al (Figure 4) to enable rotation of the screw rotors and axial movement of the screw rotors as desired by McCormick et al, for the purpose of precise control of movement resulting from the use of stepper motors as stated by Shaw in Column 7, Lines 16-18: "As it is preferred that this movement be precisely controlled .. .. stepper motors are well suited for such applications".

15. Alternatively, Claim 1 and Claims 9-12, 14-15, 17-18, 22-23, 28-29, 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fang et al (US Patent 6,257,839 B1) in view of McCormick et al (US Patent 3,605,188 A) and further in view of Shaw (US Patent 6,003,324 A)

16. In Re Claim 1, Fang et al discloses a dry pump (Figure 3) comprising a stator and first and second intermeshing screw rotors adapted for counter-rotation within the stator as described in Column 1, Lines 39-44.

17. However, Fang et al does not disclose means for effecting axial movement of the rotors as claimed in accordance with invoked 112 6th paragraph to vary a clearance between the rotors and the stator.

18. Nevertheless, McCormick et al discloses in Column 2, Lines 54-56: "It can be seen that axial adjustment of said screws 25 and 26 will vary the clearance between the screw flights 27 and 28 and the respective conical bores 30 and 31 of the cylinder 32", during the use of the pump as suggested in Column 3, Lines 5-9: "Moreover, such adjustment may be accomplished automatically in response to head pressure by providing a pressure sensor (not shown) at the die inlet which then provides a signal to move the screws forward or rearward as necessary to increase or decrease the head pressure sensed by the sensor".

19. It would have been obvious to a person having ordinary skill in the art at the time of the invention that moving the screws of Fang et al axially will vary the clearance between the screws and conical bores, thereby allowing head pressure to be controlled automatically during operation as suggested by McCormick et al, and would therefore be motivated to modify the screw rotor assembly of Fang et al in a way that allows axial movement for the purpose of controlling the head pressure.

20. Shaw discloses a bearing mechanism that allows for axial movement as follows: Shaw discloses a first screw rotor (14) and a second screw rotor (16) that are housed in

first bearing housing (300) and second bearing housing (306) respectively, the bearings housings are attached to their respective actuators (366, 384) by pins (376, 394). Note that the bearing housings are free to move within respective openings (304, 309) of the stator (220) as suggested in Column 5, Line 63 – Column 6, Line 3: "sufficient for allowing shifting (in Fig. 3 vertical displacement) of bearing". The actuators (366, 384) have threaded follower sleeves (368, 386) respectively. The threaded follower sleeves are coupled to respective drive shafts (372, 390 which are equivalent to applicant's lead screw) of stepper motors (360, 380) respectively. This apparatus for effecting axial movement is equivalent of applicant's means for effecting axial movement because it performs the same function in substantially the same way and produces substantially the same result (MPEP 2183). Note also the following disclosure by applicant with regards to equivalence: "The means for effecting axial movement of the rotors is preferably arranged so as to ensure both rotors are maintained in the same axial position, BUT MAY ALSO BE CONFIGURED SO AS TO PERMIT RELATIVE AXIAL MOVEMENT between the rotors .. .. The relative movement between the rotors can be achieved using INDEPENDENT MEANS FOR EFFECTING AXIAL MOVEMENT OF EACH ROTOR" (Page 7, Lines 1-9). Applicant has therefore allowed for independent means for effecting axial movement of each rotor as an equivalent structure. Note that Shaw also discloses additional bearings (72) and (78) respectively at the other end of the screw rotors.

21. It would have been obvious to a person having ordinary skill in the art at the time of the invention to substitute the bearings of Fang et al with the axially movable bearing

assembly, actuator and motor of Shaw that supports each screw rotor on both sides, for the purpose of precise control of movement resulting from the use of stepper motors as stated by Shaw in Column 7, Lines 16-18: "As it is preferred that this movement be precisely controlled .. .. stepper motors are well suited for such applications".

22. In Re Claim 9, the limitation "means for actively controlling operation" meets the three-prong test per MPEP 2181 and thereby invokes 35 USC 112 6th paragraph. In the instant specification, page 13, Lines 14-16, the said means for actively controlling operation in Figure 8 is the controller (108).

23. Shaw discloses in Column 7, Line 67 – Column 8, Line 1 that the stepper motors (360) and (380) are controlled by microprocessor (454) via line (478). This apparatus for actively controlling operation is equivalent of applicant's means for actively controlling operation because it performs the same function in substantially the same way and produces substantially the same result (MPEP 2183).

24. In Re Claim 10, Shaw discloses actuator block (366) and actuator block (368). The controller controls the motor which in turn controls the actuator through shaft (372 or 390).

25. In Re Claim 11, in the modified apparatus, the rotors that are mounted on the shaft rotatably mounted in the pump (Fang et al) would be axially moved by the actuators and motor (Shaw).

26. In Re Claim 12, Shaw discloses a motor (360 or 380) for rotating a drive shaft (372 or 390) engaging the actuator (366 or 368). The microprocessor (454) is configured to control operation of the motor by line (478).

27. In Re Claim 14, the actuator (366 or 384) of Shaw moves bearing assembly (300 or 306) relative to the stator (220). The bearing assembly rotatably supports the shaft of the screw rotor (14 or 16).

28. In Re Claim 15, the combination of the outer race of bearing (300 or 306), pins (376 or 394) and actuator (366 or 368) read on part of a housing for the bearing assembly, of which the actuator is a part of.

29. In Re Claim 17, Figure 3 of Fang et al clearly defines the end surface of the stator facing both end faces of the screw rotor.

30. In Re Claim 18, Shaw discloses another bearing assembly (72) and (78) respectively at the other end of the screw rotors from bearing (300) and bearing (306) that support one end of each of the rotors.

31. In Re Claim 22, the limitation “means for detecting the value of an operational parameter” meets the three-prong test per MPEP 2181 and thereby invokes 35 USC

112 6th paragraph. In the instant specification, page 14, Lines 31-32, the said means for actively controlling operation in Figure 8 is a sensor that monitors pressure, power consumption etc. McCormick et al discloses a sensor that monitors head pressure (Column 3, Line 6). This apparatus for detecting the value of an operational parameter is equivalent of applicant's means for detecting the value of an operational parameter because it performs the same function in substantially the same way and produces substantially the same result (MPEP 2183). McCormick et al is configured to control the means for effecting axial movement in response to pressure (detected value of operational parameter) as stated in Column 3, Lines 4-6: "adjustment may be accomplished automatically in response to head pressure by providing a pressure sensor".

32. In Re Claim 23, the head pressure read by the sensor of McCormick et al reads on backpressure as claimed.

33. In Re Claim 28, determining the optimum value for the rate of increasing the size of clearance or decreasing the size of clearance would be obvious to one of ordinary skill in the art because it has been held that discovering the optimum value of a result effective variable involves only routine skill in the art – MPEP 2144.05 (II-B). Note that it is well known that stepper motors can be operated at different rates, see prior art made of record in the Conclusions section.

34. In Re Claim 29, the rotors of Fang et al have a taper, where the outer diameter of each rotor decreases from the inlet (901) to the outlet.

35. In Re Claim 33, the rotors of Fang et al are clearly externally threaded as depicted in Figure 3.

36. Claims 2 – 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fang et al (US Patent 6,257,839 B1) in view of McCormick et al (US Patent 3,605,188 A) and in view of Shaw (US Patent 6,003,324 A) and further in view of Olofsson (US Patent 3,947,163 A)

37. In Re Claim 2, McCormick et al as applied to Claim 1 discloses that the means for effecting axial movement of the rotors is configured to effect axial movement of the rotors in response to head pressure read by a sensor (Column 3, Lines 5-6). However, McCormick et al does not explicitly state that axial movement is effected in response to the axial load. Nevertheless, it would have been obvious to a person having ordinary skill in the art at the time of the invention that the axial movement is also in response to the axial load because the axial load follows from the pressure of the working medium against the end of the screw thread rotor as stated by Olofsson in Column 1, Lines 22-24: “According to prior suggestions the bearings of the screw thread rotor are exposed

to the entire axial load which follows from the pressure of the working medium against the end of the screw thread rotor".

38. In Re Claim 3, Fang et al depicts in Figure 3 that each rotor is mounted on a respective shaft which is rotatably mounted on bearings within the pump.

39. In Re Claim 4, the actuator (366 or 384) of Shaw moves bearing assembly (300 or 306) relative to the stator (220). The bearing assembly rotatably supports the shaft of the screw rotor (14 or 16).

40. Claims 13 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fang et al (US Patent 6,257,839 B1) in view of McCormick et al (US Patent 3,605,188 A) and in view of Shaw (US Patent 6,003,324 A) and further in view of Kelley et al (US Patent 4,299,794 A)

41. In Re Claim 13, the drive shaft (372 or 390) of Shaw is coupled to a threaded follower sleeve (368 or 386) which reads on the conformingly threaded aperture in the actuator. It is likely that the drive shaft of Shaw is a lead screw because it is coupled to a threaded collar, however, Shaw (and McCormick et al and Fang et al) does not explicitly state that the drive shaft is a lead screw.

42. Nevertheless, Kelley et al discloses that a stepper motor (76) drives a lead screw (66) which engages a threaded element (64).

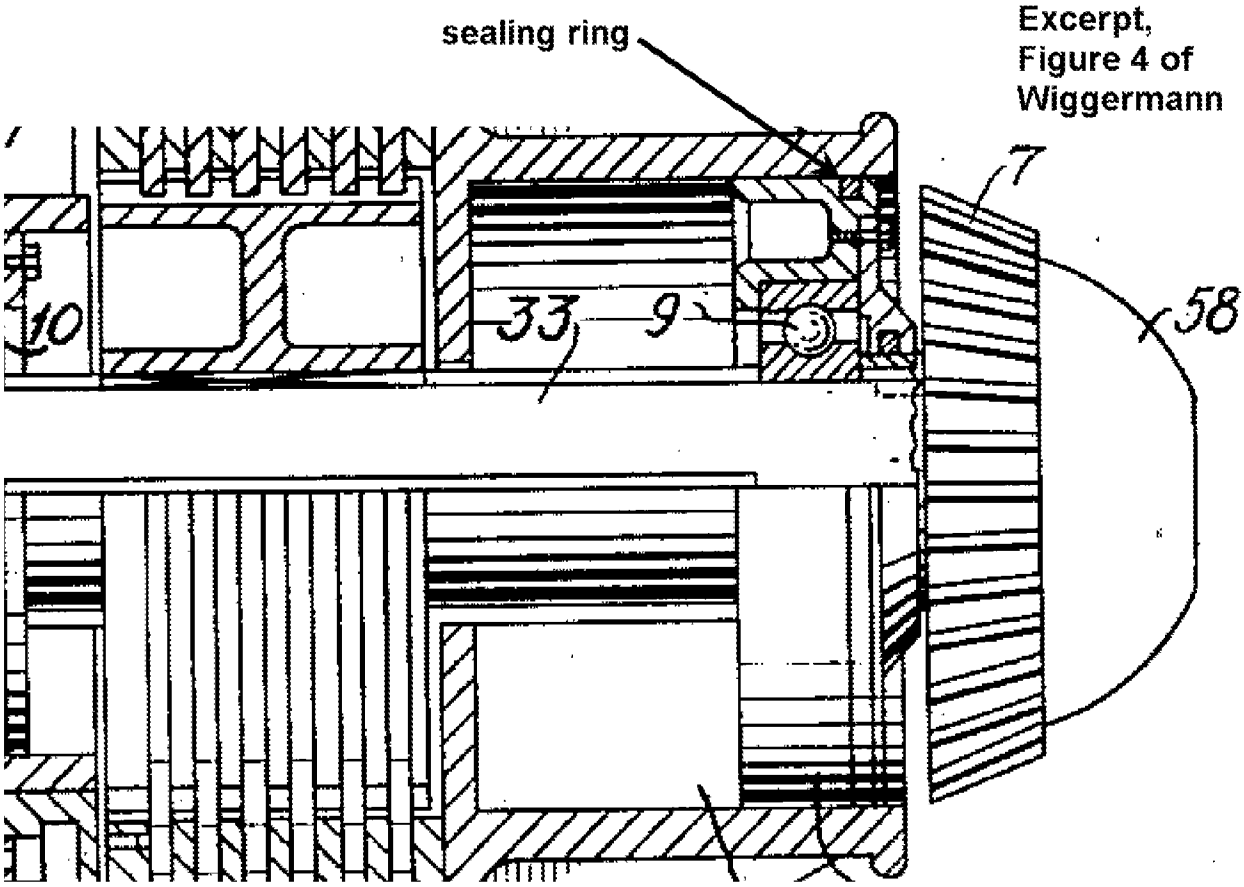
43. It would have been obvious to a person having ordinary skill in the art at the time of the invention to incorporate a lead screw as taught by Kelley et al as the drive shaft of Shaw because lead screws advantageously have a large load carrying capability.

44. In Re Claim 24, Fang et al, McCormick et al and Shaw as applied to Claim 9 discloses all the claimed limitations except for a sensor capable of detecting the amount of axial clearance between the rotors and the stator.

45. Nevertheless, Kelley et al discloses a stepper motor (76) drives a lead screw (66) which engages a threaded element (64), and sensors (82, 84) that "indicates an axial index position of piston" (Column 5, Line 5).

46. It would have been obvious to a person having ordinary skill in the art at the time of the invention to incorporate a position sensor as taught by Kelley et al at the drive shaft/lead screw of Shaw for the purpose of providing position feedback to the controller of Shaw so that axial movement can be "precisely controlled" (Column 7, Line 14 of Shaw). Note again that axial adjustment varies the clearance between the screw rotors and the conical bores (Column 2, Lines 55-57 of McCormick et al).

47. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fang et al (US Patent 6,257,839 B1) in view of McCormick et al (US Patent 3,605,188 A) and in view of Shaw (US Patent 6,003,324 A) and further in view of Wiggermann (US Patent 2,356,365 A) and as extrinsically evidenced by Matsuhashi et al (US Patent 6,267,360 B1)



48. In Re Claim 16, Fang et al, McCormick et al and Shaw as applied to Claim 15 disclose all the claimed limitations except for a sealing mechanism as claimed.

49. Nevertheless, with reference to excerpt of Figure 4 depicted above, Wiggermann discloses a piston (35) that slides axially in stator (32). The piston (35) has a bearing (9) mounted inside it that rotatably supports shaft (33). The outer surface of the piston

has a sealing ring as annotated above. The specification does not describe this feature, but in accordance with MPEP 2125: "When the reference is a utility patent, it does not matter that the feature shown is unintended or unexplained in the specification. The drawings must be evaluated for what they reasonably disclose and suggest to one of ordinary skill in the art". One of ordinary skill in the art would interpret the annotated feature as a sealing ring for a piston because this is well known in the art as extrinsically evidenced by Matsuhashi et al in Column 3, Lines 17-18 and in Figure 2, which shows a sealing ring (4) on piston (3) for sealing the piston relative to the stator (1).

50. It would have been obvious to a person having ordinary skill in the art at the time of the invention to incorporate a sealing ring as taught by Wiggermann around the bearing housing of Shaw in the stator for the purpose of sealing as extrinsically evidenced by Matsuhashi et al.

51. Claim 25 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fang et al (US Patent 6,257,839 B1) in view of McCormick et al (US Patent 3,605,188 A) and in view of Shaw (US Patent 6,003,324 A) and further in view of Moore (US Patent 6,004,271 A)

52. In Re Claim 25, Fang et al, McCormick et al and Shaw as applied to Claim 9 discloses all the claimed limitations except for a sensor capable of detecting the rate of change of axial clearance between the rotors and the stator.

53. Nevertheless, Moore discloses a motor (62) that drives lead screw (90) and a sensor (70) that provides speed feedback to controller (26) as stated in Column 7, Lines 23-26: "An optical encoder 70 is also disposed around the drive-shaft 64 and fixably mounted to the main body casing 42, and provides rotational speed feedback data to the console controller 26 TO CONTROL THE DRIVE MOTOR 62". The speed of the motor corresponds to the rate of change of axial clearance.

54. It would have been obvious to a person having ordinary skill in the art at the time of the invention to incorporate a speed sensor as taught by Moore on the drive shaft of Shaw for the purpose of providing rotational speed feedback to the controller (454) of Shaw to control the motor (360 or 380) of Shaw as suggested by Moore above.

55. Note that a stepper motor is capable of running at different rates, see prior art made of record in the Conclusions section.

56. Claim 26 rejected under 35 U.S.C. 103(a) as being unpatentable over Fang et al (US Patent 6,257,839 B1) in view of McCormick et al (US Patent 3,605,188 A) and in view of Shaw (US Patent 6,003,324 A) and further in view of Kelley et al (US Patent 4,299,794 A) and Hogan et al (PG Pub US 20020197164 A1)

57. In Re Claim 26, Fang et al, McCormick et al, Shaw and Kelley et al as applied to Claim 24 discloses all the claimed limitations except for a Hall sensor.

58. Nevertheless, paragraph [0063] of Hogan et al discloses a position sensor (58, 62) which provides a signal to the controller indicative of the position of stepper motor

(26) and piston (34). In this paragraph, Hogan et al states: "It will be understood by those in the art that many different types of position sensors may be employed for determining and controlling stepper motor position, for example, the sensor 58 could be a Hall effect sensor".

59. It would have been obvious to a person having ordinary skill in the art at the time of the invention to select a Hall effect sensor as suggested by Hogan et al as the position sensor of Kelley et al because it has no added resistance in a sensing circuit.

60. Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fang et al (US Patent 6,257,839 B1) in view of McCormick et al (US Patent 3,605,188 A) and in view of Shaw (US Patent 6,003,324 A) and further in view of Peterson (US Patent 4,265,530 A)

61. In Re Claim 27, Fang et al, McCormick et al, Shaw and Peterson as applied to Claim 9 discloses all the claimed limitations except for the controller being capable of sequentially increasing or decreasing the amount of clearance.

62. Nevertheless, Column 1, Lines 34-39 of Peterson discloses a stepper motor that is capable of sequentially moving an item (shutter blades) forward and then in reverse: "wherein a stepper motor is used to sequentially move the shutter blades toward a fully open orientation and then the motor is energized in an opposite directional sense to reverse the direction of movement of the shutter blades and return them in steps to a

closed orientation". Therefore, the stepper motor of Shaw can be capable of sequentially increasing and decreasing the size of clearance in the modified apparatus.

63. It would have been obvious to a person having ordinary skill in the art at the time of the invention that when the stepper motor of Peterson is selected as the stepper motor of Shaw, it can be capable of being moved to sequentially increase and decrease the size of the clearance because selection of Peterson's stepper motor from a finite number of resources is within the capability ordinary skill in the art. If the selection leads to anticipated success, it is likely the product of ordinary skill and common sense and not the product of innovation.

64. Claim 38 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fang et al (US Patent 6,257,839 B1) in view of McCormick et al (US Patent 3,605,188 A) and in view of Shaw (US Patent 6,003,324 A) and further in view of Moore (US Patent 6,004,271 A) and Yang (US Patent 5,912,537 A)

65. In Re Claim 38, Fang et al, McCormick et al, Shaw and Moore as applied to Claim 25 discloses all the claimed limitations except for a Hall effect sensor.

66. Nevertheless, Yang discloses in Column 6, Lines 18-24: "Moreover, although the motor sensor 42 which detects the SPEED(RPM) of the motor 40 is used as in the previous paragraphs as a working model to obtain the lifting information(LI), ONE SKILLED IN ART KNOWS THAT THERE ARE OTHER SENSORS TO DETECT THE ROTATION frequency of the motor 40 such as RPM sensor or HALL SENSOR"

67. It would have been obvious to a person having ordinary skill in the art at the time of the invention that although an optical encoder is provided by Moore to measure rotational speed of the stepper motor, one skilled in the art knows that there are other sensors to detect the speed such as a Hall sensor (as stated above by Yang). If the selection leads to anticipated success, it is likely the product of ordinary skill and common sense and not the product of innovation.

Conclusion

68. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Strunc (US Patent 4,156,170 A) discloses in the Abstract that a stepper motor can step at rates determined by the numbers supplied by the microprocessor. O'Conner (US Patent 2,957,427 A) discloses a bearing housing (94) that slides in a rectangular slide chamber (Column 5, Line 54).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DNYANESH KASTURE whose telephone number is (571)270-3928. The examiner can normally be reached on Mon-Fri, 9:00 AM to 4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Devon Kramer can be reached on (571) 272 - 7118. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Devon C Kramer/
Supervisory Patent Examiner, Art Unit 3746

DGK